UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,225	04/13/2005	Helmut Winterling	12810-00072-US	4572

30678 7590 05/26/2010
CONNOLLY BOVE LODGE & HUTZ LLP
1875 EYE STREET, N.W.
SUITE 1100
WASHINGTON, DC 20006

EXAMINER	
LISTVOYB, GREGORY	

ART UNIT	PAPER NUMBER
1796	

MAIL DATE	DELIVERY MODE
05/26/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/531,225
Filing Date: April 13, 2005
Appellant(s): WINTERLING ET AL.

Bryant Young

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/23/2010 appealing from the Office action mailed 9/23/2009

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

1.(Previously presented) A polyamide comprising a compound which includes at least one hydroxy group and has chemical bonding by way of an amide group to the end of the polymer chain, wherein the compound which includes at least one hydroxy group is a linear, unbranched alkanemonocarboxylic acid which includes at least one terminal hydroxy group, wherein the compound which includes at least one hydroxy group is present in the range from 0.001 to 2 mol%, based on 1 mole of amide groups of the polyamide, and wherein the unbranched alkanemonocarboxylic acid has the formula
HO - (CH2)n - COOH, wherein n = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15.

2.(Cancelled).

3.(Previously Presented) The polyamide as claimed in claim 1, where the unbranched monocarboxylic acid has the formula HO - (CH2)5 - COOH.

4.(Cancelled).

5.(Previously Presently) A process for preparing the polyamide as claimed in claim 1 comprising providing monomers suitable for forming a polyamide and a linear, unbranched alkanemonocarboxylic acid which includes at least one terminal hydroxy group, and polymerizing the monomers in the presence of the unbranched alkanemonocarboxylic acid.

6.(Previously Presented) A process for preparing the polyamide as claimed in claim 1 comprising, providing oligomers suitable for forming a polyamide and a linear, unbranched alkanemonocarboxylic acid which includes at least one terminal hydroxy group, and polymerizing the oligomers in the presence of the unbranched alkanemonocarobxylic acid.

7.(Previously Presented) A fiber comprising the polyamide as claimed in claim 1.

8.(Previously Presented) A film comprising the polyamide of claim 1.

9.(Previously Presented) A molding comprising the polyamide of claim 1.

10. (Cancelled).

11. (Previously Presented) The polyamide as claimed in claim 1 that is end-capped with an unbranched C1-C15 alkane with at least one terminal hydroxyl group.

12. (Previously Presented) The polyamide of claim 11 where the unbranched alkane is an attached n-pentanol.

13. (Previously Presented) The polyamide as claimed in claim 1 comprising monomeric or oligomeric units of an arylaliphatic lactam or aliphatic lactam, where the polyamide is end-capped with an unbranched C1-C15 alkane with at least one terminal hydroxyl group.

14. (Previously Presented) The polyamide of claim 13 where the monomeric or oligomeric units are selected from the group consisting of enantholactam, undecanolactam, dodecanolactam and caprolactam.

15. (Previously Presented) The polyamide of claim 13 where the monomeric or oligomeric units are based on caprolactam and the polyamide is end-capped by the reaction of 6- hydroxycaproic acid.

16. (Previously Presented) The polyamide of claim 15 in combination with an inorganic or organic pigment.

17. (Previously Presented) The polyamide as claimed in claim 1 prepared by a process comprising:

providing monomers or oligomers selected from an arylaliphatic or aliphatic lactam, aminocarboxylic acids or aminocarbonitriles;

providing an unbranched alkanemonocarboxylic acid having at least one terminal hydroxyl group; and

polymerizing the monomer or the oligomers in the presence of the unbranched alkanemonocarboxylic acid to provide a polyamide that is end-capped with an unbranched alkane having at least one terminal hydroxyl group.

18. (Previously Presented) The polyamide of claim 17 where the monomeric or oligomeric units are based on caprolactam and the alkanemonocarboxylic acid is 6-hydroxycaproic acid.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

EP 0409093	Hoyt	1-1991
3663511	Lombardi	5-1972
2264298	Brubaker	12-1941

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Issue I

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 7-9, 11-16, rejected under 35 U.S.C. 103(a) as being unpatentable over Hoyt et al (EP 0409093) herein Hoyt as evidences by Lombardi et al (US 3663511), herein Lombardi.

Hoyt discloses a fiber-forming polycaprolactam (see Page 2, line 50 and page 4, line 5, meeting the limitations of claims 7 and 9) comprising a compound which includes at least one hydroxyl group and has chemical bonding by way of an amide group to the end of the polymer chain (see page 4, line 10), which includes at least one terminal hydroxyl group and where the compound which includes at least one hydroxyl group is present in the range from 0.001 to 2 mol%, based on 1 mole of amide groups of the polyamide (see page 4, lines 20-35).

Note that Hoyt does not teach a linear, unbranched alkanemonocarboxylic acid. Instead, he teaches epsilon-caprolactone as a source of hydroxyl groups. (Note that the structures of the resulting polymer of the reference and Application examined are identical.) Hoyt does not clearly disclose a mechanism of forming the above Hydroxyl groups from the lactone.

Lombardi evidences that during the reaction of hexamethylenediamine and epsilon-caprolactone or hydroxycaproic acid (see Example 2), the amide bond forms between amine and acid (see Column 5, line 10). Hydroxyl group stays unreacted (see Example 2). Lombardi teaches 6-Hydroxycaproic acid is equivalent to epsilon-caprolactone in amino-group blocking reaction (see Column 4, line 65).

Since formation of amide bond and hydroxyl group can be possible only in case of opening of the lactone ring, Hoyt's polyamide contains a linear, unbranched alkanemonocarboxylic acid residue.

In the instant case substitution of equivalent methods requires no express motivation, as long as the prior art recognizes equivalency, In re Fount 213 USPQ 532 (CCPA 1982); In re Siebentritt 152 USPQ 618 (CCPA 1967); Graver Tank & Mfg. Co. Inc. V. Linde Air products Co. 85 USPQ 328 (USSC 1950).

Therefore, it would have been obvious to a person of ordinary skills in the art to interchangeably use unbranched alkanemonocarboxylic acid or epsilon-caprolactone as a source of hydroxyl groups, since they lead to the same polyamide structure.

Regarding Claim 8, the films based on Nylon 6 are well known. Hoyt's film has low coloration (see Examples), which indicates their higher resistance to oxidative degradation. Also, Hoyt teaches that his polyamide has very good stain resistance (see Page 2, line 40).

Therefore, it would have been obvious to a person of ordinary skills in the art to use Hoyt's modified polyamide in films, since they have good thermo-oxidative stability and stain resistance.

Regarding claim 16, Hoyt teaches a dye in his polyamide (see page 4, line 40).

Issue II

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5-6, 17-18 rejected under 35 U.S.C. 103(a) as being unpatentable over Hoyt in view of Brubaker (US patent 2264298, cited in the previous Office Action) as evidences by Lombardi.

Hoyt discloses a polyamide comprising a compound which includes at least one hydroxyl group and has chemical bonding by way of an amide group to the end of the polymer chain (see page 4, line 10), which includes at least one terminal hydroxyl group and wherein the compound which includes at least one hydroxyl group is present in the range from 0.001 to 2 mol%, based on 1 mole of amide groups of the polyamide (see page 4, lines 20-35).

Lombardi evidences that epsilon-caprolactone (used by Hoyt) and 6-hydroxycaproic acid are equivalent in amine-blocking reaction.

Hoyt and Lombardi do not disclose a method of preparing hydroxyl-capped polyamide. Instead, Hoyt teaches a reaction of polyamide with caprolactam.

Brubaker teaches a method of forming of hydroxyl terminated polyamide, comprising a reaction of caprolactam and hydroxyl-containing amine (see Example 3). Brubaker teaches that his polyamide contains 0.002 % mol of hydroxyl group based on 1 mol amide group (see Example 3).

Brubaker's method has at least two advantages over Hoyt process. Firstly, Brubaker teaches one-step method, compare to two-step process of Hoyt (the first step comprises a synthesis of a polyamide, whereas the second one includes modification of the polymer). Second advantage is that the hydroxyl-containing reagent fulfills the role of a chain length regulator in the Brubaker's process.

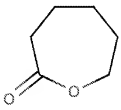
Therefore, it would have been obvious to a person of ordinary skills in the art to include caprolactone or hydroxycaproic acid in the synthesis of Hoyt's polyamide in order to obtain more economical one-step process and optimize molecular weight of the polyamide with the above reagents.

(10) Response to Argument

Issue I

Appellant argues that the structure of the Hoyt's polymer is different from the claimed polyamide, because it does not contain product of reaction of a polyamide and hydroxycarboxylic acid.

Hoyt discloses a reaction product of a polyamide and epsilon-caprolactone, which produces Hydroxyl-terminated polymer. Caprolactone is a cyclic molecule with the following formula:



Hoyt teaches that the epsilon caprolactone reacts with the amino-groups of the polymer producing a polymer with Hydroxyl end groups (see Page 4, line 10). Although Hoyt does not teach the mechanism of this reaction, it is clear that Hydroxyl groups can be formed only in case of opening the lactone cycle. As a result, the reaction above produces the same polymer as one of reaction of polyamide with a linear hydrohycarboxylic acid.

Lombardi evidences that during the reaction of hexamethylenediamine and epsilon-caprolactone or hydroxycaproic acid (see Example 2), the amide bond forms between amine and acid (see Column 5, line 10). Hydroxyl group stays unreacted (see Example 2). Lombardi teaches 6-Hydroxycaproic acid is equivalent to epsilon-caprolactone in amino-group blocking reaction (see Column 4, line 65).

Note that Claim 1 claims a polyamide, but not a method of making the polymer. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process" *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Appellant argues that the polyamide prepared according to Hoyt produces no water whereas the polyamide prepared in the disclosure produces water as a by-product and this water forming reaction leads to a polyamine with different physical properties including equal or higher melt volume rate as noted above.

However, as Examiner stated before, water may be related to the composition, based on the polyamide, but not to the polymer itself. Claim 1 claims a polyamide, not a composition. The structure of Hoyt's polyamide is clearly equal to the one of the Application examined.

Issue II

Appellant argues that Brubaker's polyamide is a product of reaction of acid-terminated polyamide and Hydroxyl amine. In contrary, Appellant claims a reaction product of amine -terminated polyamide with hydroxycarboxylic acid.

However, Brubaker produces Hydroxyl terminated polyamide in one step, which is desirable from economical and technological aspects. Another advantage of one-step process is that Hydroxy-containing compound acting as a molecular weight regulator. It is clear that depending on the ratio of the monomers (i.e. excess of amine or carboxyl-containing monomer), the end-capping agent can contain amino or carboxy end group.

Appellant argues that Brubaker's process produces a polymer with "completely different chemical structure".
This is incorrect. Brubaker produces the polymer with the following formula:
OH-R-NHCO-Polyamide-CONH-R-OH (1),
whereas Appellant's claimed formula is :
OH-R-CONH-Polyamide-NHCO-R-OH (2).
The only difference between formulas (1) and (2) is the order of NH and CO groups in the last amide bond. The elemental content of the both polyamides, as well as their terminal Hydroxyl groups are identical. Considering aliphatic nature of both polyamides, the difference above is undistinguishable as measured by regular polymer analysis methods, such as NMR, FTIR and elemental analysis. Physical properties of the polymers above are expected to be identical.

Note that Hoyt (primary reference) discloses the structure, identical to the claimed structure (2).

Please, note that Office Action mailed on 9/23/2009 contain a typo (see page 3). The clause "Claims 1,3, 7-9, 11-16, rejected under 35 U.S.C. 102(b) as being unpatentable over Hoyt et al (EP 0409093) herein Hoyt..." should be replaced by clause "Claims 1,3, 7-9, 11-16, rejected under 35 U.S.C. 103(a) as being unpatentable over Hoyt et al (EP 0409093) herein Hoyt..."

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/James J. Seidleck/

Supervisory Patent Examiner, Art Unit 1796

GL

Conferees:

James Seidleck /JJS/

/Christine Tierney/CT/

Supervisory Patent Examiner, Art Unit 1700